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IMPACT OF OIL PRICE FLUCTUATIONS ON THE ECONOMY OF NIGERIA

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ABSTRACT

Oil price fluctuations give rise to several macroeconomic impacts, which bring about economic conditions that are unhealthy for sustainable economic growth. This study aimed at extending the frontier of knowledge by examining impact of oil price fluctuations on Nigeria's economy (over the period 1970_{Q1} –2014_{Q4}), using Vector Autoregression (VAR) technique, and also investigating whether oil price has long run relationship with Nigeria's real GDP, inflation, unemployment, exchange rate and government expenditure, using the Johansen cointegration technique. The macroeconomic variables employed for the study were international oil price, real GDP, inflation, unemployment, exchange rate and government expenditure. After ensuring data stationarity, the study found that oil price had long run relationship with the real GDP, inflation, unemployment, exchange rate and government expenditure; that oil price fluctuations have positive impact on inflation and unemployment; that oil price fluctuations have negative impact on real GDP, government expenditure and exchange rate. However, these impacts were not significant. It shows that Nigeria is not highly susceptible to oil price fluctuations. This is because, over the years, the crude oil products in Nigeria have been subsidized, bringing about resilience to oil price fluctuations. Also, macroeconomic mechanisms create resilience to oil price fluctuations, especially supply side responses to oil price fluctuations. The study suggested that the National Assembly, the budget and planning office and the National Economic Planning Commission should endeavour to consider the volatility of oil price in budgetary planning and in making economic plans so that oil price fluctuations will not tamper with government fiscal plans; that the respective Nigerian government agencies should prevent macroeconomic disturbances which could arise from oil price fluctuations by putting control measures on the macroeconomic indicators that are related to oil price.

Keywords: International oil price behavior; oil price fluctuations; GDP, Aggregate demand; the transmission mechanism; Vector autoregression.
JEL Classification: O47, Q41, Q43.

1.0 INTRODUCTION

Oil price fluctuation is a crucial issue in Nigeria because the Nigerian economy depends on oil for its economic growth and development. The issue of crude oil as the basis of accumulation for the economy of Nigeria has been both a blessing and a challenge to the country. For several years, Nigeria's economic development projects, economic policy formulation, economic planning and implementation has been depending on the revenue from oil thereby making the country to be susceptible to international oil price fluctuations. Nigeria is an

oil producing country but does not have monopoly in the production and supply of oil, thus, it is not a pace-setter in oil production and supply. Being an exporter of crude oil, underdeveloped oil producing country and a price taker in OPEC, Nigeria's oil productivity is limited by OPEC regulations and Nigeria is potentially vulnerable to oil price fluctuations. This condition raises the question of how to bring about macroeconomic stability in Nigeria (Odularu, 2007).

Oil price fluctuations refer to continuous changes in the international price of crude oil and crude oil products. It involves increases and decreases in the price of crude oil and crude oil products in the international market. It reflects known, existing and anticipated future circumstances of demand and supply as well as factors that could affect the product. As a fundamental economic variable, oil price behaviour requires total attention especially in a developing economy such as Nigeria that greatly depends on oil for its survival. This is because changes in the price of a fundamental product like oil can cause drastic effects on the macroeconomy within a particular time because energy is a major input of production. The great dependence of the Nigerian economy on the revenue from oil demands empirical investigation to examine the susceptibility of the Nigerian economy to oil price fluctuations because oil is the basis of accumulation for the country.

The Nigerian oil sector can be categorized into three main sub-sectors, namely, upstream, downstream and gas. The most problematic over the years has been the downstream sector, which is the distribution arm and connection with final consumers of refined petroleum products in the domestic economy.

Crude oil's contribution to the Gross Domestic Product (GDP) of Nigeria consists of proceeds from oil exports, local sale of crude oil, domestic refining, and sale of natural gas. However, the contribution has been limited due to substantial involvement of foreign investors in the oil sector and consequent repatriation of the sector's profits and dividends abroad (Odularu, 2007). Crude oil contributes more than 90% of foreign exchange earnings in Nigeria, and the oil sector dominates other sectors in contributing to export revenues, being responsible for 98% of total export for the country in 2005. Crude oil sector contributes to employment in the country (Odularu, 2007). However, this contribution has not been relatively significant because it has some limited linkages; the sector does not have the capacity to employ the majority of the Nigeria's labour force.

One of the gains of oil revenue in Nigeria is the subsidy that the government grants to oil products to enhance economic production. A huge amount of oil revenue has been used for fuel subsidy because Nigeria imports most of the petroleum products that are refined. The subsidy lowers the prices thereby creating protection from oil price fluctuations. During high prices, this causes a burden on the federation account (Edame & Akpan, 2014).

Nigeria has embarked on oil subsidy for several years in order to reduce the effects of actual market prices of oil products on the Nigerian economy so as to achieve sustainable development.

One implication of oil price fluctuation on economic growth and performance of an oil exporting country like Nigeria is the Dutch disease Syndrome - the structural economic imbalance resulting from poor management of oil revenue. Windfalls from increase in oil price may not have expected impact on a developing economy that has not been diversified and not large enough to diversify the inflow from oil without causing inflation. Resource pull effect and spending effect result when large inflow from oil export hits a less diversified economy (Meiro & Ramos, 2010). Oil price fluctuations have effects on macroeconomic production. An adverse oil price shock reduces energy availability for industrial production, leading to price increases (inflation) and reduction in output production as well as employment level. Oil price fluctuations affect macroeconomic performance because the key macroeconomic variables may be unstable, making it difficult to make predictions on national income for the purpose of economic planning and budgeting (Edame & Akpan, 2014). Thus, crude oil price behaviour has implications on the core of Nigeria's macroeconomy.

In Nigeria, oil revenue is a key source of government revenue and it directs the course of spending. So, instability in the price of oil in the international market would chiefly among other peculiar factors, lead to unstable implementation of government projects and obligations (Ekesiobi, Oguanobi & Mgbemena, 2016). While oil production is good for the country, her major problem had been - managing the revenues to reflect in all sectors of the economy. This is because, Nigeria risks repeating patterns of weak economic governance and volatile government spending unless its policies feature certain safeguards to cushion the effects of external shocks from the country's main revenue source (Ekesiobi et al, 2016).

The behaviour of some macroeconomic variables distorts the impact which oil price change is expected to have on real output. Some macroeconomic factors such as inflation and exchange rate accompany changes in oil price, thereby nullifying the impact which oil price change is expected to have on the real GDP of Nigeria (Tariq & Sania, 2014). Thus, there is fear that oil price changes may not have significant impact on the real GDP of Nigeria. There is fear that fluctuations in the price of oil will continue to have strong effect on the Nigeria's economy as long as the government holds unto the oil sector as the basis of accumulation for Nigeria's economy. These problems and uncertainties provide the impetus for this study and enable us to ask these questions: does oil price fluctuation have long run relationship with Nigeria's real GDP, price stability (inflation), unemployment, exchange rate and government expenditure? What short run impact does oil price fluctuation have on Nigeria's real GDP, unemployment, price

stability, exchange rate and government expenditure? Seeking answers to these questions becomes the central focus of this study.

Since by and large, Nigeria depends on the revenue from oil for its growth and development and the revenue from oil invariably depends on the price of oil, it becomes of crucial importance to put the behaviour of oil price under empirical investigation and examine the impact of oil price behaviour on the oil dependent Nigerian economy.

2. REVIEW OF CONCEPTUAL LITERATURE

Oil price fluctuations refer to the continuous and irregular changes in the price of crude oil and crude oil products in the international market. According to Adelman (2000), oil price fluctuations usually occur due to seasonal changes in demand, the fixation of prices by collusion in the OPEC cartel and the unrest in the Middle East at various times. Kolawole (2002) seems to be in full agreement with Adelman (2000), pointing out that disagreements on production quotas and members mistrust have fuelled volatility.

2.1 Theoretical Literature

The Keynesian Aggregate Demand Theory

Aggregate demand (AD) is the relationship between the total spending in an economy on domestic goods and services and the price level for output. Strictly speaking, AD is what economists call total planned expenditure. Aggregate demand means total spending. It includes all four components of demand: consumption, investment, government spending, and net exports (exports minus imports). This demand is determined by a number of factors, but one of them is the price level. Recall though, that the price level is an index number such as the GDP deflator that measures the average price of the things we buy.

The following components make up aggregate demand: Consumption spending (C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M): C + I + G + X – M (Romer, 2006).

Aggregate demand (AD) slopes downward, showing that, as the price level rises, the amount of total spending on domestic goods and services declines. The wealth effect holds that as the price level increases, the buying power of savings that people have stored up in bank accounts and other assets will diminish, eaten away to some extent by inflation. Because a rise in the price level reduces people's wealth, consumption spending will fall as the price level rises. The interest rate effect is that as prices for outputs rise, the same purchases will take more money or credit to accomplish. This additional demand for money and credit will push interest rates higher. In turn, higher interest rates will reduce borrowing by businesses for investment purposes and reduce borrowing by households for homes and cars thus reducing consumption and investment spending (Brian, Carlos & Philipp, 2009).

Relevance of the Aggregate Demand Theory

Actually, the aggregate demand theory involves the output effect of price changes of consumer

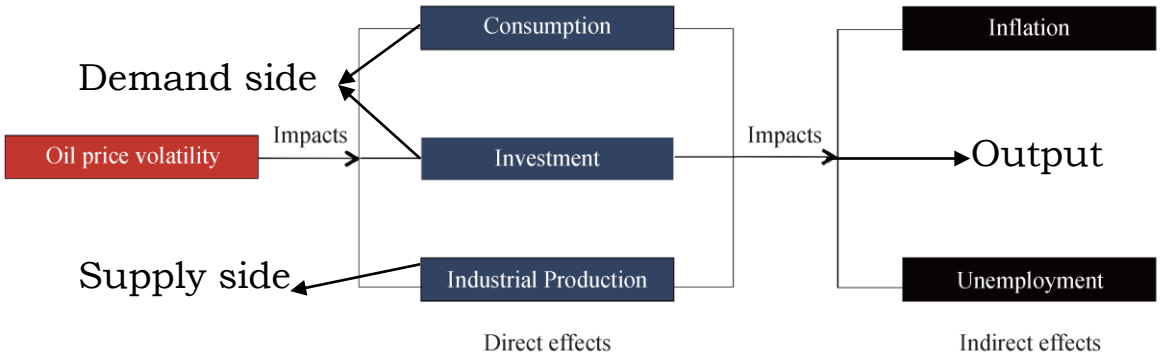
goods, the output effects of the prices of producer goods or input, the income effect of taxation on the aggregate economy. According to Brian, Carlos and Philipp (2009), oil can be adopted as a proxy for the input of production in the country so that macroeconomic output is a function of oil price. The aggregate demand curve links us with the IS curve which is crucial in discussing the transmission mechanism.

The Transmission Mechanism (Metzler, 1950)

The transmission channels through which oil price movements affect an economy was introduced by Metzler (1950).

The volatility of crude oil price has effects which are transmitted into the economy through the demand and supply side channels (Aliyu, 2009).

The Transmission Channels



Source: Ebrahim, Inderwildi and King, 2014

In the channel, consumption and investment are the economic factors in the demand side, while Industrial production is the factor in the supply side, taking oil as a crucial input factor for production in the macroeconomy. Oil price volatility could decrease consumer confidence and induce precautionary savings behaviour. It could also bring about economic uncertainty (Ebrahim, Inderwildi & King, 2014). It affects real investment because it brings about uncertainties regarding the profitability of investment and expected decreases in consumer demand. Oil price volatility affects economic production. As a result, firms can choose to maintain economic production levels by raising the final prices of their goods or respond to the pressure by reducing production levels in response to decrease in demand (Ebrahim, Inderwildi & King, 2014).

The level of unemployment could directly increase as a result of decreased consumption and industrial production levels, the level of unemployment decreases as inflation increases as illustrated in the Philips curve. Volatility of oil price has repercussions on the aggregate economy as abundantly shown by the literature. An oil price shock, as a classic example of an adverse supply shock, that is, an increase in oil price shifts the aggregate supply upward, resulting to a rise in price level and a reduction in output and employment [Dornbusch, Fisher & Startz 2001]. On the other hand, aggregate demand decreases while higher commodity prices translate to lower demand for goods and

services, resulting to contraction in aggregate output and employment level.

2.2 Empirical Literature

Ayadi, Chatterjee and Obi (2000) studied the effects oil price shocks on Nigeria, using the VAR model. The variables used were oil price, real stock returns, industrial production and net foreign assets. They found that an increase in oil price increases oil production, while inflation decreases and national currency depreciates following a positive oil price shock.

Olomola and Adijumo (2006) examined the effect of oil price shock on the Nigerian macroeconomic activities using vector Autoregressive model. The variables used were oil price, real GDP, inflation and exchange rate. They found that oil price shock does not affect output and inflation in Nigeria.

Adeniyi (2009) examined the impact of oil price shocks on Nigeria's macroeconomic variables, using the VAR model. The variables used were oil price, real interest rate, inflation and real GDP. The results indicated that oil price shocks do not account for a significant proportion of observed movements in macroeconomic aggregates.

Umar and Abdulhakeem (2010) studied the impact of oil price changes in Nigeria, using the VAR model. The Variables used were GDP, oil price, money supply and unemployment. The results showed that oil prices have significant impact on real GDP, money supply and unemployment. Its impact on the fourth variable, consumer price index is not significant. This implies that three key macroeconomic variables in Nigeria are significantly explained by an exogenous and the highly volatile variable (oil price). Hence, the economy is vulnerable to external shocks.

Moshiri and Banihashem (2011) examined impact of oil price changes on net oil exporting countries, using the VAR model. The variables were oil price and real GDP. The study found that a reduction in oil prices leads to economic stagnation in four countries but an increase in price does not lead to sustained economic growth in any country. They found that the adverse effects of higher oil prices are larger than the stimulating effects of lower prices; higher oil prices and accompanying higher revenues do not translate to a sustained economic growth.

Chuku, Usenobong, Ndifreke and Ekpeno, (2011) studied the linear and asymmetric impacts of oil price shocks on the Nigerian economy for the period 1970Q1-2008Q4, using VAR model and Granger causality test approach. The variables used for the study were oil price, GDP, output gap, real exchange rate misalignment and lagged values of current account ratio. They found that oil price shocks are not a major determinant of macroeconomic activity in Nigeria in the linear model.

Adeniyi, Omisakin, Yaqub and Oyinnola (2012) examined oil Price – exchange rate nexus in Nigeria, using the GARCH model. The variables used were oil price and exchange rate. The study found that oil price volatility had significant impact on the exchange rate in Nigeria. Decreases in oil price were found to

have an appreciating impact on real effective exchange rate, implying a loss of competitiveness of the Naira, while increases in oil price were found to be irrelevant for movements in the real effective exchange rate.

Ani, Ugwunta and Inyiama (2012) examined the relationship between oil price volatility and economic development in Nigeria. Applying Ordinary Least Square and Granger Causality test, the study shows that there was no significant relationship between oil price volatility and key macroeconomic variables (Real GDP, inflation, interest rate and exchange rate). The results suggest that in the short run, changes in the gross domestic product (GDP) are not influenced by oil price volatility, and there was no evidence of influence on key macroeconomic variables.

Mauritala, Taiwo and Olowookere (2012), analysed the impact of crude oil price, stock price and some selected economic variables (exchange rate, Inflation) on the growth of the Nigerian economy, using Johansen Cointegration, unit root test and error correction model. They found that crude oil price, stock price and exchange rate have significant impact on the growth of the Nigerian economy.

Iklaga and Evbuomwan (2012) Using Structural VAR, studied impact of oil price shocks on the economy of Nigeria. The variables used were oil price, inflation, money supply, exchange rate and real GDP. The result showed that oil price shocks have significant impact on the Nigerian economy. They conducted an analysis of a broad array of macroeconomic variables including output, inflation, exchange rate and money supply and some administered prices. The results showed that oil prices have considerable impact on output, inflation, money supply and exchange rate.

Alley, Asekome, Mobolaji and Adeniran (2012), employed General Methods of Moment (GMM), to study oil price shocks and the Nigerian economy. The variables used for the study were oil price and real GDP. The study found that oil price shocks insignificantly retards economic growth while oil price itself significantly improves it.

Ebele (2014), using Engle Granger cointegration technique examined impact of oil price volatility on Nigeria's economic growth. The variables used for the study were GDP, oil reserve, oil revenue and oil price. The study found that oil price volatility had negative impact on Nigeria's economic growth, while other variables such as crude oil price, oil revenue and oil reserve had positive impact on the Nigerian economy.

Nwanna and Eyedayi (2014) examined impact of oil price volatility on the growth of Nigeria's economy, using multiple regressions. The data used for the study were oil price, exchange rate and real GDP. The study found that oil price had positive and significant impact on Nigeria's economic growth. The study concluded that oil price volatility does not have a positive impact on the economy but oil price itself does.

3. RESEARCH METHODS

Empirical Model Specification

This study employed the Vector Autoregression (VAR) model based on Olomola and Adijumo

(2006); impact of oil price shocks on Nigeria's macroeconomic variables.

Thus, following Olomola and Adijumo (2006), we consider a VAR model of order

p:$Yt = C_0 + \sum_{j=1}^{k}$ i$Yt - 1$……(3.1)

Where: Y_t= (*IOP, INF, RGDP, UNEMP, EXR, GOV*) is an *n x* 1 vector of six endogenous variables, and, *IOP* is international oil price; INF is inflation rate; RGDP is real gross domestic product; EXR is exchange rate; *UNEMP is* unemployment rate and GOV is the government expenditure. While Y_{t-1} is the corresponding lag term for order *i., i* is the *n x n* matrix of autoregressive coefficient vector Y_{t-1}, for *i* = 1, 2, …*k*. C_0 = (C_1, C_2,…,C_n) is the *C* intercept vector of the VAR model. ε_t = ($\varepsilon_1 t$, $\varepsilon_2 t$,…, εnt) is the *n x 1* vector of white noise process. *K* is the number of lagged terms. VAR estimations are very sensitive to lag structure of variables.

A system of equation can be deduced from the above compact equation as follows:

$$L_nIOPt = \propto_1 + \sum_{i=1}^{m}\theta_{1i}L_nIOP_{t-i} + \sum_{i=1}^{m}\beta_{1i}INF_{t-i} + \sum_{i=1}^{m}\gamma_{1i}RGDP_{t-i} + \sum_{i=1}^{m}\delta_{1i}UNEMP_{t-i} + \sum_{i=1}^{m}\pi_{1i}EXR_{t-i} + \sum_{i=1}^{m}\Phi_{1i}GOV_{t-i} + \varepsilon_{1t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

$$L_nINFt = \propto_2 + \sum_{i=1}^{m}\theta_{2i}L_nIOP_{t-i} + \sum_{i=1}^{m}\beta_{2i}INF_{t-i} + \sum_{i=1}^{m}\gamma_{2i}RGDP_{t-i} + \sum_{i=1}^{m}\delta_{2i}UNEMP_{t-i} + \sum_{i=1}^{m}\pi_{2i}EXR_{t-i} + \sum_{i=1}^{m}\Phi_{2i}GOV_{t-i} + \varepsilon_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

$$L_nRGDPt = \propto_3 + \sum_{i=1}^{m}\theta_{3i}L_nIOP_{t-i} + \sum_{i=1}^{m}\beta_{3i}INF_{t-i} + \sum_{i=1}^{m}\gamma_{3i}RGDP_{t-i} + \sum_{i=1}^{m}\delta_{3i}UNEMP_{t-i} + \sum_{i=1}^{m}\pi_{3i}EXR + \sum_{i=1}^{m}\Phi_{3i}GOV_{t-i} + \varepsilon_{3t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.4)$$

$$L_nUNEMPt = \propto_4 + \sum_{i=1}^{m}\theta_{4i}L_nIOP_{t-i} + \sum_{i=1}^{m}\beta_{4i}INF_{t-i} + \sum_{i=1}^{m}\gamma_{4i}RGDP_{t-i} + \sum_{i=1}^{m}\delta_{4i}UNEMP_{t-i} + \sum_{i=1}^{m}\pi_{4i}EXR_{t-i} + \sum_{i=1}^{m}\Phi_{4i}GOV_{t-i} + \varepsilon_{4t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.5)$$

$$L_nGOVt = \propto_6 + \sum_{i=1}^{m}\theta_{6i}L_nIOP_{t-i} + \sum_{i=1}^{m}\beta_{6i}INF_{t-i} + \sum_{i=1}^{m}\gamma_{6i}RGDP_{t-i} + \sum_{i=1}^{m}\delta_{6i}UNEMP_{t-i} + \sum_{i=1}^{m}\pi_{6i}EXR_{t-i} + \sum_{i=1}^{m}\Phi_{6i}GOV_{t-i} + \varepsilon_{6t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.6)$$

$$L_nEXRt = \propto_5 + \sum_{i=1}^{m}\theta_{5i}L_nIOP_{t-i} + \sum_{i=1}^{m}\beta_{5i}INF_{t-i} + \sum_{i=1}^{m}\gamma_{5i}RGDP_{t-i} + \sum_{i=1}^{m}\delta_{5i}UNEMP_{t-i} + \sum_{i=1}^{m}\pi_{5i}EXR_{t-i} + \sum_{i=1}^{m}\Phi_{5i}GOV_{t-i} + \varepsilon_{5t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.7)$$

Where: IOP = International Oil Price, INF = Inflation rate, RGDP = real Gross Domestic Product

UNEMP = Unemployment, EXR=Exchange Rate, GOV = Government Expenditure,

L_n = Logarithmic form values, Δ = first difference operator

$\propto, \theta, \gamma, \delta, \pi$ are Φ parameters to be estimated and ε represents the serially uncorrelated error terms.

The VAR model was adopted because of many advantages including its convenience in capturing the stylized facts about dynamic interrelationship between stationary time-series/variables and allowing for investigation of the multivariate model and identifying influence of the effects through variance decomposition. And it explicitly takes into account the co-integration structure of the variables (Lutkepohl, 2005). Marno (2004) also

supported this view and stated that the VAR models usually provide more precise direct and indirect effects of oil price shocks on economic growth. The VAR model is used in forecasting results because the information that is used during analysis captures also the past values of the other variables.

4. DATA ANALYSIS AND RESULT PRESENTATION

The data used for this study were secondary data collected from Central Bank of Nigeria statistical bulletin and National Bureau of Statistics.

Unit Root Test

The unit root test determines the order of integration of series under consideration using the Augmented Dickey – Fuller (ADF) test

Table 4.1: Summary of Unit Root Test at 5%

LEVEL			FIRST DIFFERENCE	
Variable	No Trend	With Trend	No Trend	With Trend
LNINF	-4.422633	-4.409080	-17.31268	-0.712128
LNUNEMP	-0.712128	-1.552439	-12.41530	-12.44951
LNGOV	-0.942406	-1.905833	-6.512664	-6.523672
LNEXR	-0.315970	-1.865198	-14.32899	-14.29057
LNRGDP	-1.953685	-2.483063	-2.483063	-13.30471
LNIOP	-0.668650	-10.20708	-10.28763	-4.422633
Critical Value	-3.469691	-4.013946	-3.469691	-3.468980
	-2.878723	-3.436957	-2.878723	-2.878413
	-5.76010	-3.142642	-2.576010	-2.575844

Source: Author's Computation

From the test result in ADF table, all variables are integrated of order one, except inflation, which is integrated of order zero and order one.

Cointegration Test

The cointegration test is undertaken to identify whether there is at least one cointegrating vector, to examine whether there is long run relationship among the variables.

Table 4.2 Cointegration Test Results

Hypothesis	Alternative Hypothesis	Trace Statistics	95% critical value	Max-Eigen statistics	95% Critical Value
r = o	r = 1	90.56505	95.75366	44.37670	40.07757
r ≤ 1	r = 2	46.18835	95.75366	20.78618	33.87687
r ≤ 2	r = 3	25.40217	69.81889	16.91521	27.58434
r ≤ 3	r = 4	8.486959	29.79707	6.610716	21.13162
r ≤ 4	r = 5	1.876243	15.49471	1.830612	14.26460
r ≤ 5	r = 6	1.876243	3.841466	0.045631	3.841466

Source: Author's Computation

In cointegration, we employed Johansen Cointegration test. The trace statistic dictates zero cointegrating vector, while Maximum Eigen value dictates one cointegrating vector. Our further analysis is based on the Maximum Eigen value. We conclude that there is long run relationship among the variables.

Table 4.3: Normalized Long Run Estimates

Variable	Coefficient	Standard Error
LNRGDP	1.000000	-
LNIOP	1.447647	0.76102
LNINF	2.799012	0.44980
LNUNEMP	-0.109159	0.72387
LNGOV	0.659756	0.31445
LNEXR	-0.404374	0.39068

The long run estimates were normalized by multiplying them by (-1)

The long run estimates have shown that in the long run, international oil price has a positive relationship with the real GDP of Nigeria. This implies that, in the long run, ceteris paribus, if international oil price is increasing, the real GDP of Nigeria will be increasing. Inflation has positive relationship with the real GDP in the long run, implying that in the long run, higher macroeconomic price increases will increase the real GDP of Nigeria. Unemployment has negative coefficient, indicating that in the long run, an increase in unemployment will reduce the real GDP of Nigeria. Government expenditure has positive coefficient, which implies that there is positive relationship between government expenditure and real GDP in the long run so that if government expenditure increases, ceteris paribus, the real GDP of Nigeria will increase. Finally, the long run negative relationship between exchange rate and the real GDP shows that if exchange rate increases, the real GDP of Nigeria will reduce.

Vector Autoregression Analysis

Table 4.4: Vector Autoregression (VAR) Estimates

	LNRGDP	LNIOP	LNINF	LNUNEMP	LNGOV	LNEXR
LNRGDP(-1)	0.924852	-0.003983	0.139419	0.020663	0.040119	0.025170
LNRGDP(-2)	-0.006082	-0.012559	-0.144948	-0.006088	-0.014207	0.007871
LNIOP(-1)	-0.009444	0.894298	0.006357	0.061366	-0.095504	-0.048921
LNIOP(-2)	-0.015832	0.004764	-0.215176	-0.004708	-0.031674	-0.012842
LNINF(-1)	0.011399	0.003691	0.464955	-0.029362	0.030602	-0.015636
LNINF(-2)	0.021654	0.038320	0.182320	-0.002707	0.049373	-0.012321
LNUNEMP(-1)	0.070638	0.081228	-0.193170	0.895158	-0.026520	-0.003170
LNUNEMP(-2)	-0.047288	0.030347	0.318820	0.002107	0.091297	0.037431
LNGOV(-1)	0.001547	-0.004181	-0.153723	-0.030841	0.918063	-0.010913
LNGOV(-2)	0.066930	0.013667	0.171275	0.005307	0.015807	0.002563
LNEXR(-1)	0.064466	-0.058739	-0.268290	-0.040069	-0.145465	0.726754
LNEXR(-2)	-0.107525	0.054593	0.263237	0.076319	0.205945	0.261820
C	0.262184	0.125960	1.298871	0.144515	0.525506	-0.020822
t. Statistic	-0.009444	0.894298	0.006357	0.061366	-0.095504	-0.048921
Std. Error	(0.19234)	(0.08781)	(0.33641)	(0.07969)	(0.28386)	(0.07991)
R-squared	0.971013	0.949463	0.463477	0.965586	0.978153	0.997436
Adj. R-squared	0.968417	0.944938	0.415430	0.962505	0.976197	0.997207
F-statistic	374.0676	209.7950	9.646359	313.3178	499.9740	4344.541
Log likelihood	-25.95479	89.31494	-108.1381	103.5637	-83.16844	103.1681
Akaike AIC	0.529997	-1.038299	1.648137	-1.232160	1.308414	-1.226777
Schwarz SC	0.794457	-0.773838	1.912598	-0.967699	1.572874	-0.962317
Mean dependent	11.90297	3.575914	2.588574	1.999433	11.62451	2.171558
S.D. dependent	1.701477	0.588262	0.691723	0.647013	2.892444	2.376920

Source: Author's Computation

From the VAR estimates in table 4.4, the result shows the level of endogeneity or direction of causality of the endogenous variables, comparing the F-statistic values and the coefficient of multiple determination (R^2). From the result, it was revealed that LNIOP,

LNRGDP, LNGOV, LNEXR and LNUNEMP were more endogenous than exogenous, having the R^2 of 94.9%, 97.1%, 97.8%, 99.7% and 96.6%, with F-statistics of 209.80, 374.1, 500.0, 4344.5.4 and 313.3.6 respectively. However, INF was less endogenous as it has R^2 of about 46.3%.

From the table of VAR results (tab 4.4), oil price fluctuations did not have significant impact on the real GDP, Inflation (price stability), unemployment, exchange rate and government expenditure in Nigeria. However, oil price fluctuation had positive impact on inflation and unemployment, while it has negative impact on real GDP, exchange rate and government expenditure.

The diagnostic tests indicated that the models were well specified, meeting the conditions of all the tested statistics. The R^2 and the adjusted R^2 which were 88.8% and 87.7% on the average respectively show that the model has good fit. The high – F-statistic value suggested that there existed significant relationship between the variables. Hence, the analysis based on the estimates of the model is reliable and should be trusted.

Discussion of Findings

The empirical results have been able to provide an opinion on the impact of oil price fluctuations on Nigeria's economy. The methodology was based on Olomola and Adijumo (2006), using the vector autoregression technique to determine impact of oil price volatility on the economy of Nigeria.

The major motivation for this study was the shocking results of Olomola and Adijumo (2006) and many others, that oil price fluctuations do not have significant impact on the economy of Nigeria. This study however investigated impact of oil price fluctuations on the economy of Nigeria. There are channels through which oil price volatility impact on the macroeconomy; through consumption and investment (demand side) and through industrial production (supply side), oil price volatility affects the macroeconomy. [Metzeler (1950), Ebrahim, Inderwili & king (2014)].

The unit root test for stationarity showed that all the variables under study are stationary at first difference 1(1). This motivated us for the cointegration test.

The cointegration test was undertaken to find out whether there was long run relationship between oil price and real GDP, inflation, unemployment, exchange rate and government expenditure. The result showed that there is long run relationship between oil price and Nigeria's real GDP, inflation, unemployment, exchange rate and government expenditure.

This study further estimated impact of oil price fluctuations on economy of Nigeria, using real GDP, inflation and unemployment to represent the core of Nigeria's economy and adding exchange rate and government expenditure as other relevant macroeconomic variables that oil price fluctuations affect. Using vector autoregression technique, the result shows that oil price fluctuations had positive impact on inflation and unemployment, while it had

negative impact on Nigeria's real GDP, exchange rate and government expenditure. However, these impacts were not significant. The finding on government expenditure was not in line with a-priori expectation. Other findings are in line with a-priori expectation.

The result that oil price fluctuation had a negative impact on the real GDP of Nigeria was in agreement with Olomola and Adijumo (2006), Adeniyi (2009), Alley, Asomeri, Mobolaji and Adeniran (2012), Chukwu, Usenobong, Ndifreke and Ekpeno (2011), Ani, Ugwunta and Inyiama (2012) and Ebele (2014) all in the case of Nigeria.

The finding of this study that oil price fluctuations negatively affect the real GDP, exchange rate and government expenditure showed that oil price fluctuations have destabilizing effects on macroeconomic activities and government expenditure. It indicates that Nigeria has a case of Dutch disease. The finding that oil price fluctuations do not have significant impact on these variables shows that the Nigerian economy is not highly susceptible to oil price fluctuations and this implies that expected growth targets can be achieved. A major reason is that over the years, crude oil products in Nigeria have been subsidized, thereby creating resilience against oil price fluctuation in the economy of Nigeria. The structure of an economy or macroeconomic mechanisms create resilience to oil price fluctuations, especially supply side responses to oil price fluctuations such as inflation. Oil price volatility normally transmits into the economy through industrial production. Industrial production levels can be maintained despite of the uncertainty created by oil price fluctuations. Producers maintain production levels by increasing product prices to incorporate uncertainty premium in order to compensate for increasing production cost.

Oil price fluctuation negatively affects the Nigerian economic growth (though not to a statistically significant extent). In spite of structural rigidities facing the country, Nigeria's economic growth has been on the increase. Oil price fluctuations did not have direct impact on the real GDP but at the prevailing exchange rate, oil price affects real GDP.

As a net oil exporter, Nigeria's real exchange rate appreciates when increase in oil price facilitates higher inflow of foreign exchange into the country.

5.SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The rationale behind this study was to investigate what happens to Nigeria's macroeconomy due to oil price fluctuations and to find out whether there was long run relationship between oil price and the real GDP, inflation, unemployment, government expenditure and exchange rate. The study was carried out within the period $1970_{Q1} - 2014_{Q4}$.

The study employed a broad range of literature on the relationship between oil price and macroeconomic variables and observed that there is a dichotomy in the result of studies with some studies showing that oil price fluctuations

have significant impact on Nigeria's economy and some other studies' results show oil price fluctuations do not have significant impact on Nigeria's economy. This provided the driving force for this research.

In order to address our objectives, we employed the Augmented Dickey fuller (ADF) test to examine the stationarity status of all the variables considered in this study. We found that all variables were stationary at first difference, thereby providing the motivation for cointegration test. The study employed the Johansen cointegration approach to test whether there is long run relationship between oil price and the selected macroeconomic variables. The result showed that oil price had long run relationship with real GPD, Inflation, unemployment, exchange rate and government expenditure.

Using the vector autoregression technique, the study examined whether oil price fluctuations have significant impact on Nigeria's economy. The result showed that oil price fluctuations did not have significant impact on the real GDP, Inflation, unemployment, exchange rate and government expenditure. The result broke the hunch (uncertainty whether oil price fluctuations have significant impact on the economy of Nigeria), being consistent with the findings of Olomola and Adijumo (2006), Adeniyi (2009), Chukwu, Usenobong, Ndifreke and Ekpeno (2011), Asekomeh, Mobolaji and Adeniran (2012), Ani, Ugwunta and Inyiama (2012) and Ebele (2014).

5.2 Conclusion and Policy Recommendations

The behaviour of a fundamental variable such as oil price requires total attention especially in a developing economy such as Nigeria that greatly depends on oil for its survival. This study was anchored on the behaviour of international prices of energy resources as they affect the countries that produce and export energy resources. The paper examined impact of oil price fluctuations on the economy of Nigeria, analysing its relationship with key macroeconomic variables, using the vector autoregression technique and the Johansen cointegration method. The findings revealed that there was long relationship between oil price and the selected macroeconomic variables. The study found that oil price fluctuations did not have significant impact on real GDP, Inflation, unemployment, exchange rate and government expenditure. This implies that oil price fluctuations did not have significant impact on Nigeria's economy. It shows that the economy is not highly susceptible to oil price volatility. Macroeconomic mechanisms create resilience to oil price volatility, especially supply side responses to oil price volatility such as inflation.

The study proffered the following recommendations:

1. The Nigerian National Assembly, the budget and planning office and the National Economic Planning Commission of Nigeria should endeavour to consider the volatility of oil price in budgetary planning and in making economic plans so that oil price

fluctuations will not tamper with government fiscal plans.

2. The respective government agencies of Nigeria should prevent macroeconomic disturbances which could arise from oil price fluctuations by putting control measures on the macroeconomic indicators that are related to oil price.
3. Nigerian monetary authorities should examine the behavioural relationship between oil price and Nigeria's inflation rate so as to prevent oil price uncertainties from causing macroeconomic instability in order to enable Nigeria achieve sustainable development.
4. In order to achieve economic stability in Nigeria, there should be an expansion of systems that mandate global cooperation and concerted action in oil supply chain management such as the IEA collective action framework. This will help to minimize short term oil price volatility.
5. Nigeria should increase the production of alternative renewable fuels that can stand as substitutes for oil so as to reduce dependence on the use of oil that brings about volatility.

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